Space Weather Forecast

Issued on Friday, 01 September 2023 at 13:08 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

---

Space Weather Forecast Headline: G1-G2 (Minor-Moderate Storm) intervals poss day 2 but more likely early day 3 (02-03 Sep) due to CME arrival. Chance of Isolated M-flares (R1 Blackout)

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was Moderate in the last 24 hours, with a long duration M-class flare originating from an active region in the northwest of the visible disc. This was preceded by a CME (Coronal Mass Ejection), clearly visible in available imagery along with an obvious coronal dimming. The CME is currently under analysis and while full details will be communicated later, it is thought to be Earth-directed.

There are currently 5 sunspot regions on the visible disc. The largest and most complex region is the one that was responsible for the M-class flare earlier. Of the four remaining regions, two are relatively large but mostly inactive. The other two regions are simple unipolar spots.

A filament (ribbon of material held together by the Suns magnetic field) was observed lifting off the northwest of centre-disc at around 30/2100 UTC. This was a slightly unusual event as despite being located in the northwest, the subsequent coronal mass ejection (CME) was to the south and slightly to the east, perhaps due to the proximity of a coronal hole to the northwest of the eruption. The CME has been analysed and is likely to arrive at Earth late on day 2 or early day 3 (02-03 Sep), but with low confidence.

Solar Wind / Geomagnetic Activity: Solar wind parameters were indicative of a connection with the high speed stream originating from a coronal hole. The solar wind speed increased from 320 to 400km/s, peaking at around 450km/s later. The magnetic field associated with the particles was moderate all along but only saw a slight rise in strength, the important north-south component remaining largely unchanged. Resulting geomagnetic activity was Quiet to Unsettled (Kp 1-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) rose from background levels to S1 Minor Radiation Storm shortly after 01/0400 UTC, reaching a peak around 01/0600 UTC.

Four-Day Space Weather Forecast Summary

Solar Activity: : Activity is expected to be mostly Low with a chance of rising to Moderate, most likely from the larger sunspot region in the northwest.

Solar Wind / Geomagnetic Activity: Earth is currently under the influence of the HSS originating from CH40, with solar winds fluctuating between 400km/s and a Quiet to Unsettled geomagnetic activity. However, there is one, possibly two, Earth-directed CMEs in the forecast, which may combine to arrive late on Day 2 or early on Day 3. The results of the second CME are

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2023. All Rights Reserved.

still pending but if confirmed, geomagnetic activity is likely to become Active with G1/G2 (Minor/Moderate) storms and a slight chance of a G3 (Strong) Storm interval on Day 3 (03 Sept).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to slowly decline towards background levels however, further Minor Storms are possible, mostly in the next two days.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2023. All Rights Reserved.

Met Office Space Weather Forecast

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	10	60	20
Strong	G3	No	1	5	20	2
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	30	30	30	30
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	Yes	10	10	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2023. All Rights Reserved.